REMARKS

Reconsideration and allowance of the subject application are respectfully requested. Claims 1-9 are pending in the present application, claim 1 is independent, claims 10-16 have been canceled, and claims 1-5 have been amended.

35 USC § 112 1st and 2nd paragraph rejections

The Examiner has rejected claims 1-16 of the application under 35 USC § 112 1st paragraph, as allegedly failing to contain subject matter which "was not described in the specification in such a way as to enable one skilled in the art ...to make and/or use the invention" (OA, pg. 3). The Examiner further states that it "is clearly questionable whether this invention could ever be built and function as described" and further recites MPEP 2164.01 as requiring the applicant to submit actual evidence of a working device as allegedly one of ordinary skill could not make and use the invention without "undue experimentation" (Office Action (OA) pg. 2, 5 Dec. 2005). The Examiner states some factors to be considered when determining "undue experimentation" and further states that "the amount of direction provided (F) – minimal as there are no exact structures and methods of making the needed structures shown..." (OA, pg. 3).

The Examiner has also rejected the application under 35 USC § 112, 2nd paragraph as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention (OA, pg. 4). The Examiner further states that "the nature of this ... computing device is such that applicant must show every step, every material, every source of particles, every measurement device, every method and every material required to build and use this invention or at least teach how one of ordinary skill would do so" (OA, pg.3).

I.) First the Applicant directs the Examiner's attentions to the amendment of claims 1-5 and the cancellation of claim 10-16. The Applicant will now address the issues stated by the Examiner.

II.) First Applicant directs the Examiner's attention to the relevant portion of MPEP 2164.01(A) which lists the factors in question:

> There are many factors to be considered when determining whether there is sufficient evidence to support a determination that a disclosure does not satisfy the enablement requirement and whether any necessary experimentation is "undue." These factors include, but are not limited to:
> (A) The breath of the claims;
> (B) The nature of the invention;
> (C) The state of prior art;
> (D) The level of one of ordinary skill;
> (E) The level of predictability in the art;
> (F) The amount of direction provided by the inventor;
> (G) The existence of working examples; and
> (H) The quantity of experimentation needed to make or use the invention based on the content of the disclosure....M.P.E.P. § 2164.01(a)

The Applicant directs the Examiner's attention further to section MPEP 2164.01(a), which states:

> A conclusion of lack of enablement means that, based on the evidence regarding **each of** the above factors, the specification, at the time the application was filed , would not have taught one skilled in the art how to make and/or use the full scope of the claimed invention...M.P.E.P. § 2164.01(a) pg, 2100-186

Additionally:

> The determination that "undue experimentation would have been needed to make and use the claimed invention is not a single, simple factual determination. Rather, it is a conclusion reached by weighing **all of** the above noted factual consideration... M.P.E.P. § 2164.01(a) pg. 2100-186

The Examiner has not addressed each factor, for example the level of one of ordinary skill (factor D), and the Applicant will illustrate this by addressing several of the

Examiner's comments concerning perfect mirrors, in particular the Examiner has stated that "it is also noted that the invention requires perfect mirrors and charged particles for certain embodiments whereas positrons and electrons will interact with the mirrors and each other."

First the specification does not refer to "perfect mirrors" rather an illustrative example is provided (Fig.4) showing a positron path x, and electron paths "a" and "b." The mirror used in this non-limiting example are "composed of metal plates providing a suitable potential barrier" (Specification, para. [0068]). Clearly one of ordinary particle physics background would recognize that metal plates , for example ones stacked and separated by a small space between, and having various potentials would create an opposing electric field to the incident electron. Typical "electrostatic mirrors" are composed of plates with a middle portion missing to allow the electron to penetrate into the stacks as it slows down and is eventually repelled with essentially the same initial energy it started with. Such mirrors have been used for decades in space physics instruments for charged particle detection and are common knowledge amongst those of ordinary skill.

III.) Additionally a working example is not needed for enablement. MPEP § 2164.02 clearly states:

> Compliance with the enablement requirement of USC § 112, first paragraph, does not turn on whether an example is disclosed. M.P.E.P. § 2164.02

Additionally, even if an example is provided it need not be a working example:

> An example may be "working" or "**prophetic**." M.P.E.P. § 2164.02

Thus, Applicant respectfully requests the Examiner to directly cite the relevant section in the M.P.E.P. requiring submission of a working example, and as stated (e.g., Fig. 4) illustrative examples have been provided.

IV.) The Examiner states that "the theoretical nature of applicant's invention requiring entangled particles and measurement schemes including interaction free measurement have never been experimentally shown or proven and there is no exact description of exact devices and experimental evidence..."(OA, pg. 2)

Applicant directs the attention of the Examiner to the IDS reference cited titled "Experimental quantum teleportation" where "it is demonstrated experimentally. During teleportation, an initial photon which carries the polarization that is to be transferred and one of a pair of entangled photons are subjected to a measurement such that the second photon of the entangled pair acquires the polarization of the initial photon" (Abstract, Dik Bouwmeester et al., Nature, vol. 390, 11 Dec. 1997) Note also that this reference, by one of ordinary skill, deals with the interaction of photons, which respectfully the Examiner erroneously states with respect to claim 6 that "photons are non interacting particles" (OA, pg. 3). The Bouwmeester reference further describes the experimental set up and experimental results (Photograph shown in Fig. 2 of Bouwmeester).

Additionally claim 6 clearly states: "including a three-level atom by regarding a ground state in which the **atom can absorb the photons** as a state in which the second particle is absorbed by the first particle", where the absorbing atom defines the state in which the second particle is considered to be absorbed by the first particle, **which does not require absorption of one photon by another, only absorption of the photons by the atom**.

V.) With regard to the Examiner's statements regarding holes, it should be noted that a system that interacts with electrons will also interact with holes.

VI.) Finally the Examiner states that there is no "interaction free measurement" Applicant directs the Examiner's attention to the specification which states in part:

> [0002]... an interferometer which performs an interaction-free measurement (IFM)... (Specification)

> 0012] In the following description, an interaction-free measurement (IMF) is adopted as the fundamental concept. The IFM is an observation method formulated by Elitzur and Vaidman and derived to solve the following problem. That is, "when there is an object which always absorbs a photon by a strong interaction if the photon comes near enough to the object, how can it be decided whether this object is present or absent without causing it to absorb the photon?" The reason why the photon is preferably not absorbed by the object is because, for example, there is a risk that the object will explode if it absorbs the photon. (Specification)
>
> [0013] The means by which Elitzur and Vaidman solved this problem will be described below (see also references (18) and (19)). FIG. 20 is a diagram **showing an experiment of an Interaction-free measurement (IFM) performed by Elitzur and Vaidman.** In this experiment, a Mach-Zehnder interferometer including two beam splitters which act as boundaries between an upper path a and a lower path b is used. A state in which a single photon is present on the path a is expressed as ... (Specification)

Clearly an experimental setup has been described in at least one reference cited, for example which uses a Mach-Zehnder interferometer to make an interaction free measurement as defined by the experiment.

Thus clearly one of ordinary skill in the art would know the meaning of what an "interaction free measurement" was (e.g., non–photon absorbing event) by referring to the cited references.

In view of the above, the Applicant respectfully requests reconsideration and withdrawal of the rejection under 35 USC § 112, 1st and 2nd paragraph.

CONCLUSION

In view of the above amendments and remarks, the Applicant respectfully requests reconsideration and withdrawal of the formal objections and rejections to the claims, and the rejections based on prior art. Because all claims are believed to define over prior art of record, Applicants respectfully request an early indication of allowability.

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If the Examiner has any questions concerning this application, the Examiner is requested to contact the undersigned at (408) 468-2517 in the San Jose, CA area.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayments to Deposit Account No. 50-2456 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Very truly yours,

Canon U.S.A. Inc.
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By _____ 5 April 2006
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